

developing a strategy for protection through cumulative impact analysis. The influence of sea level rise on these and associated ecosystems should be considered in all projections into the future. Failure to do so would be to ignore the most fundamental property of sea-level controlled wetlands.

C. 4. Fringe Swamps

C. 4. a. Description. Fringe swamps are forested wetlands that occupy the shorelines of Albemarle Sound and the mouths of some of its major tributaries. The sound is large enough to generate wind-induced water level fluctuations that are distinct from the hydrology and hydrodynamics of interior wetlands isolated from shoreline influences. Fringe swamps differ from interior swamps in the amount of flushing, the texture and elevation of surface sediments, and the structure of vegetation. The position of fringe wetlands at the interface between aquatic ecosystems and interior wetlands makes them important ecologically, hydrologically, and geologically.

Because this wetland type has not been recognized elsewhere and is presented here as an example of a unique situation for the Albemarle-Pamlico Estuarine System region, it is valuable to refer back to the introduction to this section for a definition of this wetland type.

A common and representative example of transition of vegetation in fringe swamps is a sequence of: (1) dead or dying cypress trees under permanently flooded conditions near the shoreline, (2) fairly well stocked forest on a slightly elevated levee near the shoreline, and (3) a subtle change in species composition that may be accompanied by diminished average basal area of trees toward the interior between 200 - 300 m from the shoreline (Brinson In Prep.b).

Swamps that occur between small brackish marsh creeks and the freshwater zone at the mouth of streams also may have attributes of fringe swamps. They are under sea-level control and are located too far downstream to have riverine characteristics. A transitional zone such as this was studied in the vicinity of South Creek on the Pamlico River (Brinson et al. 1985). These swamps are being overtaken by the upstream migration of brackish marsh in response to sea level rise.

Fringe swamps are exposed to wind generated water level fluctuations in estuaries. Hydrologically, they are exposed to a similar regime as nontidal brackish marshes. The periodicity and depth of flooding vary with their location and will depend upon the position of the site with respect to orientation of the estuary and direction and duration of the wind.

The substrate may be inorganic or organic depending on whether sea level has risen substantially above the base of the preexisting land surface. For example, many locations along the eastern shore of the Alligator River are underlain by highly organic sediments, either accumulated in response to rising sea level or exposed at a shoreline site due to erosion into organic deposits of previously interior wetlands. On the western shoreline, clayey deposits prevail which appear once to have been upland soils (Brinson In Prep.b).

Erosion by wave action is responsible for the structure of the most exposed portion of the fringe swamp. Isolated cypress trees are characteristic of this zone and represent relicts of a more complex forest. Behind this, most fringe swamps have a subtle storm levee, although on high energy shorelines it can be quite pronounced. Most commonly, however, the elevation of the nearshore sediment surface is only slightly higher than the wetland interior. Microrelief increases toward the forest interior as shoreline processes diminish and the forest assumes characteristics similar to the interior wetland. In most areas observed, shoreline processes are not evident 100 to 200 m from the shoreline (Brinson, personal observations).